

Arguments/Remarks

Rejection under 35 USC §112

Claims 1-12 are rejected under 35 USC §112 as being indefinite. Specifically, the Examiner states that it is not clear what applicants consider to be low levels of acetamide.

In order to overcome this rejection, claim 1 has been amended to incorporate the limitation of former claim 13 (i.e., the highly purified acetonitrile has no more than 0.3 milligrams of acetamide per liter of acetonitrile. Former claim 13 has been canceled.

Rejection under 35 USC §103

Claims 1-13 have been rejected under 35 USC §103 as being unpatentable over the combination of Presson et al., Schaller et al. and Campbell et al. The Examiner maintains that Presson et al. teach a continuous acetonitrile recovery process comprising multi-step distillation to obtain high purity acetonitrile. The Examiner notes that Presson et al. do not disclose the reflux stage and is silent on the level of acetamide in the purified acetonitrile product. The Examiner then states that Schaller et al. teach purification of acetonitrile by fractional distillation using similar reflux ratios to that claimed in the instant application. Finally, the Examiner maintains that Campbell et al. disclose a purification process using strongly acidic ion exchange resins for the purification of semi-refined nitriles. Also, the Examiner asserts that Campbell et al. further disclose that the purification of nitriles using ion exchange resins is well known in the art. The Examiner concludes that one having ordinary skill in the art would have been motivated to combine the teachings of Presson et al., Schaller et al. and Campbell et al. with the expectations of obtaining acetonitrile with almost all impurities removed. The Examiner adds that “there is no teaching in the specification to ascertain what Applicants consider to be low levels of acetamide.”

Applicants respectfully traverse.

Initially, Applicants point out that the Presson et al. reference is directed to the continuous recovery of an acetonitrile stream produced during ammoxidation of propylene to acrylonitrile. The Schaller et al. reference is directed to a purification of an acetonitrile stream which has been subjected to oxidative treatment. The primary

objective of the Schaller et al. procedure is to treat an acetonitrile stream which has been pre-treated by oxidation. The Schaller et al. reference in the abstract clearly states that the invention pertains to an improved process for ultra-purification of acetonitrile which has been treated by oxidation and distillation. In addition, the claims in the Schaller et al. reference also contain this limitation. Moreover, Schaller et al. state (see the translation of Schaller et al. reference) that the primary reason for the ultra-purification is to remove the oxidation impurities which are present after the acetonitrile has been catalytically oxidized. Accordingly, it is clear that the Schaller et al. procedure is directed to a purification of a different type of stream than the stream being recovered by Presson et al. Therefore, it is respectfully submitted that there is no motivation to one of ordinary skill in the art which would have made the combination of Presson et al. with Schaller et al. obvious to one of ordinary skill in the art. Since the purification procedure of Schaller et al. is directed to acetonitrile streams which have been oxidized and is directed to the removal of oxidation impurities, where is absolutely no suggestion in Schaller et al. that this means of purification can be or should be applied to acetonitrile streams which have not been subjected to oxidation. The Presson et al. reference is such a stream. Accordingly, it is respectfully submitted that there is absolutely no motivation to one of ordinary skill in the art to make the combination suggested by the Examiner, which, of course, is essential in sustaining any rejection under 35 USC §103 based upon a combination of references. See In re Bond, 15 USPQ2nd 1566 (CAFC 1990) and In re Gorman, 18 USPQ2nd 1885, (CAFC 1991).

Moreover, even if the combination of Presson et al. with Schaller et al. is proper (Applicants strenuously object to this combination), it is respectfully submitted that the Schaller reference does not disclose a distillation process similar to the one claimed by Applicants. First, the distillation process described by Schaller et al. is at atmospheric pressure whereas the process of the present invention specifically claims a first distillation at below atmospheric pressure (at the drying column) and a second distillation at above atmospheric pressure (at the product column). Secondly, the high reflux ratios taught by Schaller et al. are used only to minimize losses because of the volume of inert (stripping) gas being fed to the distillation towers. The Presson et al. process does not

utilize any stripping gas. Accordingly, one of ordinary skill in the art would not have found it obvious to modify Presson et al. in view of Schaller et al. because the reason for the use of the reflux loops taught by Schaller et al. is the absolutely absent from the Presson et al. procedure. That is, since Presson et al. does not use any stripping gas, one of ordinary skill in the art would not have found it obvious to make the modification suggested by the Examiner because the reason for the modification to the Presson et al procedure does not exist.

Finally, the Examiner has relied upon Campbell et al. to conclude that the additional resin treatment step set forth in the claimed process would also have been obvious to anyone of ordinary skill in the art. Campbell et al. teach the use of a resin treatment to remove impurities from adiponitrile. The Examiner states that the combination of Campbell et al. with Presson et al. and Schaller et al. is proper because adiponitrile is structurally similar to acetonitrile.

It is respectfully submitted that the Examiner's position with regard to the combination of Campbell et al. with Presson et al. and Schaller et al. is improper. The structural formula for acetonitrile CH_3CN while adiponitrile has a structural formula of $\text{NC}(\text{CH}_2)_4\text{CN}$. Acetonitrile is characterized as having a low boiling point and being soluble in water and alcohol. Its primary use is as a solvent. Adiponitrile is characterized with a high boiling point (295°C) and being slightly soluble in water. Its use is as an intermediate in the manufacture of nylon and it may be synthesized by acrylonitrile as opposed to being a by-product formed during the manufacture of acrylonitrile. It is respectfully submitted that there are simply very few structural similarities between acetonitrile and adiponitrile which can make one of ordinary skill in the art jump to the conclusion that the purification procedure for adiponitrile may be applied to acetonitrile. See The Condensed Chemical Dictionary, Tenth Ed., p. 21, 1981, attached hereto, for the formula of adiponitrile recited above.

Moreover, the impurities removed in the Campbell et al. process for purifying adiponitrile are impurities produced in the conversion of adipic acid to adiponitrile (col. 2, lines 10-12). These impurities are not impurities normally found in acetonitrile which has been produced during the manufacture of acrylonitrile. Campbell et al. state that a

list of adiponitrile impurities can be found in U.S. Patent 3,152,186, attached hereto. A comparison of the list of impurities (col. 1, lines 55-64, of the '186 patent) shows that there is a substantial difference in the impurities treated by Campbell et al. as compared to the impurities removed by Applicants in their claimed process. The primary impurity removed by Applicants is acetamide which is not ever mentioned in the Campbell et al. patent. It is respectfully submitted that one of ordinary skill in the art would not have found it obvious to combine the procedures disclosed by Campbell et al. to treat a substantially different material (acetonitrile vs adiponitrile) to remove substantially different impurities, e.g., acetamide.

A suggestion that acidic ion exchange resin beds are beneficial for the removal of impurities from some organic compounds is at best an "obvious to try" for other materials. However "obvious to try" is not and has never been the standard of patentability under 35 USC §103. See In re Antonie, 195 USPQ 6 (CCPA, 1977).

Lastly, Applicants have amended their broad claim to require that the process produces highly purified acetonitrile having no more than 0.3 milligrams of acetamide per liter of acetonitrile support for this low level of acetamide in highly purified acetonitrile is in the specification in Examples 3-7 and 10. There is no teaching or suggestion in the cited references that acetonitrile could be purified to remove this impurity to such low levels.

Summary

There is nothing in the combination of Presson et al., Schaller et al. and Campbell et al., which teaches or suggests a process for producing highly purified acetonitrile having no more than 0.3 milligrams of acetamide per liter of acetonitrile. Further,

1. There is no suggestion of such highly purified acetonitrile;
2. There is no suggestion as to the specific distillation process used to obtain this product;
3. There is no suggestion that resin beds can be used to remove acetamide impurities.

As such, Applicants respectfully request that the instant rejection be withdrawn and that the application be forwarded to issuance.

Respectfully submitted,

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